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Using evidence-based practice to reduce ventilator associated pneumonia

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Oral Presentations

SURVIVAL RATES FROM A SOUTH AFRICAN REGIONAL TRAUMA CENTRE

D Allard

INTRODUCTION: Our hospital is a high-volume trauma centre in the gangland of suburban Cape Town capturing a 1.4 million underprivileged population.

All acute trauma management and operating is done by junior surgeons-in-training under supervision. No blood bank, no critical care specialists and no radiological special investigations are available on site. Less then half of the senior surgeons have formal specialist training. Medical officers give anaesthesia.

Providing optimal care is a constant challenge. We monitor our interventions by collecting morbidity and mortality data.

AIMS: What survival rates can be achieved in a South African high-volume regional trauma centre operating with limited resources? We analysed retrospectively our data of the last 7 years (June 2000 to May 2007) to determine the survival of all patients with chest trauma and abdominal trauma.

RESULTS: 7 172 patients were treated for trauma to the chest (more stab wounds than blunt trauma or gunshot injuries). 96% of the total number were treated with an intercostal drain (6 918 out of 7 172) with a very low rate of missed fatal injuries (22 out of 6 918 = 0.3 %). 4% of the total number needed a thoracotomy (254 out of 7 172) and 73% survived (186 out of 254). More than half of the thoracotomies were done for a penetrating cardiac injury with a 75% survival rate (97 out of 129). The patients undergoing a thoracotomy survived more often a chest wall or lung injury than a cardiac injury or a gunshot wound. 1 561 patients were treated surgically for abdominal trauma. 66% of the total number (1 027 out of 1 561) had a laparotomy for stab wound and 97% survived (994 out of 1 027). 29% had a laparotomy for a gunshot wound (456 out of 1561) and 88% survived (400 out of 456). 5% had a laparotomy for blunt abdominal trauma (78 out of 1 561) and 86% survived (67 out of 78). 92% of the patients are male with an average age of 27 years. Surgeons-in-training were the first operators in more than 50% of the laparotomies and 25% of thoracotomies.

CONCLUSIONS: In a trauma hospital with high incidences of stab wounds to the chest more than 96% of chest trauma is treated conservatively with a chest drain.

75% of thoracotomies for penetrating cardiac injury survive. Laparotomies for stab wound, GSW and blunt trauma carry respectively 97%, 88% and 86% survival.

Resource limitations do not prevent SA trauma surgeons from achieving excellent results comparable to international data.

A PROSPECTIVE AUDIT OF BURN WOUNDS ADMITTED TO A SINGLE REGIONAL HOSPITAL

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INTRODUCTION: Burns are common injuries in developing countries and especially in peri-urban informal settlements. This study looks at the spectrum of burns admitted to Edendale Hospital in Pietermaritzburg, a regional hospital serving such a population.

METHODS: A formal burn unit was established in October 2006. The team consists of a registrar and a consultant general surgeon with consultations to the plastic surgeon when needed. A prospective database was maintained from August 2006 to March 2007. Standard demographic data, detailed description of the burn, resuscitation, surgical intervention, outcome and length of stay were recorded..

RESULTS: A total of 201 patients with burns were admitted during this period. (males 102 (51%), females 99 (49%)). The breakdown of adults to children was 55:45%. The average age for adults was 40 years (range 16 to 82 years), and for children 3 years (range 6 months to 9 years). The average burn size was 14% total body surface area. The burn depths were superficial (40%), deep dermal (16%) and full thickness (31%). In children most were superficial burns (70%), and in adults full thickness wounds (57%). Adults are mostly burnt with fire (48%), followed by hot water (26%) and electrical burns (7%). Children are more commonly burnt with hot water (70%) with fire being 8%. Other less common mechanisms are hot oil or porridge, hot plastic, stove plates, petrol bombs, and lightning. For distribution, legs are most commonly affected in adults (30%) and limbs and faces in children (33% and 24%). Overall limbs are most frequently burnt. 15% of all patients have a delayed presentation from 2 - 21 days, with an average delay of 11 days. 20% of all patients required debridement in theatre, more often adults (30%) rather than children (12%); 30% required skin grafting. Hospital stay averaged 68 days overall, 33 for adult and 21 for children. 10 patients were not yet discharged at the completion of this audit. The shortest stay was 1 day and the longest 161 days. But on closer inspection, the average length of stay was 112 days in 2006, and reduced to 24 in 2007 so far.

An average of 57 days from burn to graft and 22 days from graft to discharge was recorded, with a reduction in time to graft down to 20 days in 2007.

Outcome was recorded as completely healed, almost healed or patchy healing where 'almost' indicated a small area still to re-epithelialise and 'patchy' referred to small islands of granulation tissue still requiring dressings to heal completely. 30 % of wounds were completely healed on discharge, 40% almost and 10% patchy. 6 patients refused hospital treatment and took themselves out of our care, with 13 deaths in the unit over the period of the audit, making mortality 6%. The patients that died had an average age of 50 years (range 3 to 82 years) and a total burn surface area of 50% .(range 14 - 85%) which makes the predicted mortality 100%.

Eight of the patients were burnt by fire and 4 were struck by lightning. Length of time survived was 10 days (range 1 to 28 days). 2 patients were treated with burn wound excision and grafting but demised from sepsis on day 17 and 20. 4 patients were inadequately resuscitated and demised from acute renal failure. The remaining 6 patients were treated palliatively on an elective basis.

Referral on discharge was mostly to local clinics (33%), or home (25%), with the remainder to the surgical outpatient department at Edendale Hospital, 6% to the original referring hospital and 5% had to be transferred to our tertiary referral centre for more specialised care.

CONCLUSION: Burns are common and affect the most vulnerable sectors of society. They consume a great deal of health care resources. Although a formal burn team has improved our results, with a reduced hospital stay and earlier grafting, a burn area of greater than 40% is still universally fatal in our hands. Limited resources have necessitated a pragmatic approach. Awareness campaigns may reduce the incidence of burn wounds and secure improved funding for the management of these devastating injuries.

AN INVESTIGATION INTO THE IMPLEMENTATION OF AN EMERGENCY UNIT TRIAGE SYSTEM IN A SELECTED PRIVATE HOSPITAL

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OBJECTIVE: Triage assessment of patients on arrival at an emergency unit is an essential function in quality emergency care provision. Critically ill or injured patients are not necessarily obviously identifiable and so triage assists in the process of sorting and prioritising patients according to their level of acuity. Specifically the Cape Triage Score utilised in the study objectively identifies the critically ill/injured as well as those persons who have such potential but who may not be necessarily obviously in urgent need of attention.

METHOD: This study was performed within an emergency unit that experienced serious problems with the sorting of patients on their arrival. After implementation of the Cape Triage Score, a questionnaire was distributed among staff utilising the new triage system. The investigation sought to answer specific questions concerning the triage nurse's roles, competencies required, and strengths and weaknesses of the implemented system. The study also suggests guidelines to improve the triage system within the unit.

RESULTS: The triage system was received well by participants. The roles of the triage nurse are multifaceted and extensive competencies are required. The strengths of the implemented triage system outweighed the weaknesses as perceived by the respondents. Guidelines for implementing triage in emergency units are provided.

CONCLUSION: Triage is not negotiable in emergency medicine and the unit investigated benefited from its inception. The methods and processes of triage should still be adapted to each unit arrangement as patient flow and staff allocation differs in specific units.

AN INVESTIGATION INTO THE SCOPE OF PRACTICE OF A REGISTERED CRITICAL CARE NURSE IN A PRIVATE HOSPITAL

J Bell

INTRODUCTION: The skilled critical care nurse is expected to make independent decisions and take action to meet dynamic patient needs based on her/his knowledge and clinical skill without discounting scope of practice parameters. Practice experience has shown that the critical care nurse is often uncertain about whether these clinical activities are protected by the regulations of the South African Nursing Council.

AIM: The aim of this study was to investigate the opinion of registered critical care nurses in the private healthcare sector related to their clinical activities and interpretation of the Scope of Practice (No. R 2598 of 30 November 1984 as amended.).

METHODOLOGY: A non-experimental, exploratory descriptive study was conducted in 19 private hospitals in Cape Town area with a sample of 71 registered critical care nurses. A questionnaire was developed and validated to collect data. Quantitative data was analysed statistically with qualitative data being analysed thematically.

RESULTS: It was found that the legal and professional guidelines in place do provide a foundation for the clinical activities of the critical care nurse in the private hospital sector. It is suggested that it is rather the critical care nurses' interpretation of the scope of practice regulation that limits clinical nursing practice as opposed to the wording of the regulations.

It is recommended that critical care nurses must use the regulations as a foundation for critical, analytical and reflective practice to meet patient needs rather than as a set of rules to be followed.

A POST AUTHORISATION SURVEY TO EVALUATE PLASMA CONCENTRATIONS OF TEICOPLANIN IN ADULT HOSPITALISED PATIENTS TREATED FOR SEPSIS IN SOUTH AFRICA

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OBJECTIVE: It has been suggested that higher teicoplanin trough levels (C_{min}) ≥ 20µg/ml should be targeted for specific infections. This open label, multi-centre, study determined levels following administration of loading doses of 6 mg/kg 12 hourly followed by 6 mg/kg once or twice-daily to patients with suspected or diagnosed Gram-positive infections.

METHODS: Troughs and peaks were collected 15 min prior to and 60 min after drug administration. Levels were determined with an Abbott TDx®/FLx® analyzer and Seradyn Teicoplanin Innofluor assay kits. Mean C_{min} and peak levels (C_{max}) were calculated for 4 days of therapy.

RESULTS: 74 patients with complete records were analysed. All received 6 mg/kg 12-hourly on day 1. Thereafter 40 received 6 mg/kg twice daily (BD group) and 34 patients, 6 mg/kg once daily (OD group). In the OD group (normal renal function) mean C_{min} was 8.67µg/ml from D2-4 and mean C_{max}, 25.16µg/ml. The C_{min} and C_{max} (impaired renal function) were 10.16µg/ml and 27.35µg/ml respectively.

In the BD group (normal renal function), mean C_{min} levels increased by an average of 5.49 µg/ml/24hrs to 21.99 µg/ml by D4 and the C_{max} increased by an average of 10.40 µg/ml/24 hrs to 42.03 µg/ml by D4 (3.89 µg/ml/24hrs from day 2). The C_{min} (renal impairment) increased by 10.37µg/ml to 42.57 by day 4. A trough of 20 µg/ml was achieved the beginning of day 3.

Too few values were available to calculate the C_{max} values for those with renal dysfunction

CONCLUSION: The higher targets recommended for certain infections were achieved by D4 with teicoplanin doses of 6 mg/kg twice-daily.

NURSING DOCUMENTATION IN AN ACCIDENT AND EMERGENCY DEPARTMENT: AN AUDIT

CA Carter, BR Bhengu, L Govender

INTRODUCTION: In accident and emergency departments there are often long waiting times and the lack of available hospital beds result in long delays to admission; thus the Emergency Department becomes a general ward and inadequate staffing levels compound this situation. Any deterioration in a patient's condition is often undetected. It has been proposed that the Modified Early Warning Scoring System (MEWS), be introduced into the Accident and Emergency Department. Baseline data needed to be established prior to introducing MEWS; thus an audit was undertaken.

METHODOLOGY: Files of adult patients admitted to the wards via the Emergency Department in the preceding 24 hours were audited on a random basis over a 5-week period. Information analysed included waiting times; time to admission; observation intervals; interval from final observations to admission; types and frequency of observations; frequency of nursing entries; night duty was also compared to day duty.

RESULTS: Results revealed that record keeping was poor; observations were inconsistent; there were delays to being seen by medical personnel and delayed consultation with specialty services; night staff appeared to be less compliant with both documentation and observations.

CONCLUSIONS: Documentation in the Emergency Department is generally of a low standard with observations being done inconsistently and important parameters such as respiration being rarely monitored. Possible causes for these findings include design of documentation; lack of knowledge and insight; patient load and lack of supervision. In-service education on documentation was initiated. MEWS is now being introduced. A further audit is planned to monitor changes in compliance with nursing documentation

SURVIVING SEPSIS: PROMOTING PRACTICE GUIDELINES OUTSIDE OF ICU

K Gerber, L Hosie, CM Jones, G Leaver, D Mossop, A Kapila

OBJECTIVE: Infections leading to severe sepsis have serious cost implications for any healthcare system. Of all ICU admissions in the UK 27% are admitted with severe sepsis,[1] with very high mortality rates of between 30-50%.[3] In aiming to promote good practice in the future, in line with the treatment guidelines promoted by the Surviving Sepsis Campaign[4] onto general wards in our district general hospital, we have conducted baseline audits to find out the prevalence of sepsis among patients in several areas in the hospital, and to determine if treatment complied with the Sepsis Resuscitation Bundle.

METHODS: A retrospective audit of all adult patients admitted to A&E, CDU, Critical Care Outreach and for one week patients on general surgery wards were performed. A severe sepsis screening tool[2,4] was adapted and used to ascertain the prevalence of sepsis, interventions and outcome.

RESULTS: Of the septic group:

- Only (59%) had blood cultures taken at any time during their admission.
- (40%) never had lactate measured patients
- Only 3 had a central venous line in situ – no monitoring
- 10 were admitted to ICU.

CONCLUSION: A high number of patients being admitted to various areas in our hospital had severe sepsis. The mortality rate found was in line with the published literature reviewed. However, treatment received did not always comply with the Resuscitation Bundle and improvement in processes have been identified and implemented.

1. Gao, F., Melody, T., Daniels, D.F., Giles, S., Fox, S. The impact of compliance with 6-hour and 24-hour sepsis bundles on hospital mortality in patients with severe sepsis: a prospective observational study, *Critical Care* 2005, 9: R764-770.
2. Institute for Healthcare Improvement – www.ihi.org
3. NICE: An appraisal of Drotrecogin Alfa (activated) and Sepsis 2004.
4. Surviving Sepsis Care Bundle (Campaign) in England – www.survivingsepsis.org.

EFFECTIVENESS OF CONTINUOUS AND BILEVEL POSITIVE AIRWAY PRESSURE VERSUS STANDARD MEDICAL THERAPY FOR ACUTE ASTHMA: A RANDOMISED CONTROLLED TRIAL

Hanekom S G, van Aswegen H, Eales C, Engelbrecht L, Becker P

Patients with acute asthma exacerbation (AAE) frequently present at emergency units. The role that non-invasive positive pressure ventilation (NPPV) can play in an AAE remains unanswered although it is frequently used in the clinical setting.

OBJECTIVE: To investigate if the early use of NPPV in the forms of CPAP and BiPAP together with standard medical therapy (ST) in AAE can decrease time of response to therapy compared to ST alone. We further tested the effect of BiPAP against CPAP in AAE.

METHODS: Asthmatic patients presenting with AAE (PEFR % predicted < 60 %) at the emergency unit were randomised to ST, ST and CPAP or ST and BiPAP. Groups presented similar baseline characteristics.

RESULTS: Thirty patients fulfilled the inclusion criteria. Respiratory rate and sensation of breathlessness was significantly improved at the end of treatment for both CPAP and BiPAP groups ($p = 0.0463$; $p = 0.0132$ respectively) compared to ST alone. Lung function was significantly improved in the CPAP group at the end of treatment ($p = 0.0403$ for PEFR and $p = 0.0293$ for PEFR % predicted) compared to ST + BiPAP and ST alone.

CONCLUSION: These results suggest that adding NPPV to ST for an AAE improves clinical signs and lung function faster than ST alone. CPAP seems more effective than BiPAP in ameliorating lung function.

AN ANALYSIS OF PATIENT DETERIORATION, MANAGEMENT AND PROCESSES INVOLVED IN TRANFER TO HIGHER LEVEL OF CARE

Le Roux E, Welkovics N, Hayes M, Gwilym L, Steyn S, van Eeden L

BACKGROUND: Inpatient deterioration is a global phenomenon and timely recognition and action improves outcome. In addition correct placement, tailored to the patients' needs, utilises the increasingly scarce and expensive high care and intensive care beds optimally. As a result of clinical audit a problem in our institution was identified – that of increasing patient transfers to a high level of care.

METHOD: A prospective audit was undertaken of all transfers to a higher level of care during this pilot study, combined with a retrospective chart analysis by senior medical and nursing personal.

RESULTS: Of the 4 419 admission during the study period, 34 patients (0.77%) were transferred to a higher level of care. Of these, data was reconstructable in 32 patients (94.12%) representing 38 transfer episodes. In 48.57% of transfers deterioration was recognised correctly. Delay in recognition was longer for general wards (median 0 vs. 10 hours). A median time of 65 min to ready the bed in the unit of higher care was recorded and was longest during early day shift (129 min). Further deterioration occurred in 58.33% of transfers while waiting for the bed. Overall mortality was 35% and a subset of 'double' transfers (ward - high care - ICU) exhibited a 71.43% mortality.

CONCLUSION: Ward staff are inadequately trained to recognise and deal with patients with deteriorating physiological function. Bed utilisation is maximal in the units of higher care and therefore delays in transfers occur during morning shifts. As a result of these conclusions, staff training was instituted as to normal clinical parameters as well as the institution of an outreach program. A current follow-up study to analyse the effect of the above is being conducted.

THE EFFECT OF THAWING FRESH FROZEN PLASMA (FFP) AT VARIOUS TEMPERATURES ON *IN VITRO* COAGULATION FACTOR ACTIVITY

B Levy, M Isaacs, B Jacobson, S Bhagwanjee

Thawing of FFP in South Africa is not standardised. FFP thawed at high temperatures may denature clotting factors but no study has addressed the postulate of clotting factor activation in FFP thawed at high temperatures. The purpose of this project was to study the in vitro effects of thawing FFP at various temperatures on coagulation parameters.

METHOD: Twenty units of FFP were divided into satellite bags by the SABTS. Bags were assigned to thawing temperatures of 22, 37, 45 or 60°C. Thawed samples were tested using thromboelastography (TEG) and routine coagulation tests. Data were analysed using parametric and non-parametric tests.

RESULTS: Significant differences were found in fibrinogen, D-Dimers, PTT, PT, alpha angle and maximum amplitude in the 60°C temperature group compared with the other groups. Mean fibrinogen level (172 g/l) was lower ($p < 0.05$) and PT (30.73sec) and PTT (50.38sec) prolonged ($p < 0.05$). Alpha angle and MA were shallower and narrower respectively, compared with the 37°C and 45°C groups ($p < 0.05$), but not the 22°C group.

D-Dimers in the 45°C group were higher (0.59*10^2 ng/l) than the other groups ($p < 0.05$). The mean PT of the 45°C group was shorter (13.974 sec) than the 22°C and 37°C groups ($p < 0.05$).

CONCLUSION: FFP thawed at 45°C and 60°C resulted in abnormal findings, suggesting factor activation and denaturation and should not be practised.

THE PROFILE AND SELECTED OUTCOMES OF CABG PATIENTS IN THE CAPE METROPOLITAN AREA. A BASELINE STUDY

Shamila Manie; Susan Hanekom; Mary Faure

STUDY AIM: To describe the profile and selected outcomes of CABG patients admitted in the Cape metropolitan area.

DESIGN: A prospective descriptive study design with a multicentre observational approach was followed.

METHOD: Only patients undergoing isolated CABG surgery were included in the study. Demographic data, pre-operative medical status, intra-operative, as well as postoperative information, were collected using a self-designed structured initial assessment form. Relationships between different variables were analysed by means of: ANOVA, correlations, linear and logistic regressions.

RESULTS: 245 patients were admitted to the 7 hospitals which provide CABG surgery in the Cape metropolitan area. The profiles of patients admitted to private and state institutions were similar. The mean age of the sample was 60 (± 10). The mean LOS of the total cohort was 12 (±5.5) days, with patients in the state hospitals staying longer 13.4 days (± 7.1). Patients > 60 years were twice as likely to have a LOS >12 days (odds ratio = 2.49; 95% confidence interval = 1.33 - 4.65). The development of a pleural effusion or pneumothorax was associated with an increased LOS ($p<0.01$). At least one postoperative pulmonary complication (PPC) was reported in 65% of the population.

CONCLUSION: Patients in this cohort were younger than in developed countries. Age > 60 years was a predictor of a LOS >12 days. Patients were most likely to develop a PPC on day 3 after CABG surgery. Physiotherapeutic intervention, if any, would be well aimed at those patients older than 60 years of age.

USING EVIDENCE-BASED PRACTICE TO REDUCE VENTILATOR ASSOCIATED PNEUMONIA

Kathleen Ohman

Ventilator associated pneumonia (VAP) has been on the increase with a reported mortality rate of 25%. Research identifying causative factors and practice changes to reduce its incidence has been conducted (Dreyfus, 1991; Kotilainen, 1997). Weinstein, Chinn, and Larson (2004) reported that pulmonary aspiration increases with supine positioning and pooling of secretions above the ET tube cuff. Valles (1995), Mahul (1992) and Kollef (1999) found that special ET tubes with continuous suction remove pooled secretions above the cuff and decreased VAP by 50%.

In 2004, the Centers for Disease Control and The American Association of Critical Care Nurses published recommendations to reduce VAP. Recommendations included establishing an oral care protocol, routine subglottic suctioning, HOB elevation 30°-45°, and reducing the frequency of ventilator circuit changes. Professional standards of the American Association of Respiratory Care support these recommendations.

This presentation will describe the research and USA recommendations for reducing VAP. The process by which one USA hospital changed the practice for ventilated patients to drastically reduce the incidence of VAP will be described. The changes included revising a mandatory ventilator bundle adding DVT and PUD prophylaxis, HOB elevation, daily sedation vacation, daily weaning assessment, decreased frequency of tubing changes, and increased oral care, endotracheal and subglottic suctioning frequency. A family information sheet explains the importance of these measures.

Within 6 months of implementing the practice change 2.75 lives were saved and the number is growing. The benefits of the practice change, including cost and saved lives, will be addressed.

INSULIN RESISTANCE IN CRITICAL ILLNESS

Urs Wilgen, Shahed Omar, Nigel Crowther, Rudo L Mathivha, Janice Paiker

OBJECTIVES: To describe the inflammatory and metabolic response and its effect on insulin resistance in critical illness.

METHODS: Prospective, observational study. Baseline bloods for tumour necrosis factor alpha (TNFα), interleukin 6 (IL-6),

adiponectin (Adipo), total cholesterol (TC), triglycerides (TG), insulin, C-Peptide (CPep) and cortisol (Cort) were collected on admission (D0), D3, D7 and at discharge.

OUTCOME MEASURES: The relationship between cytokines, hormones, lipids, glucose and inflammatory proteins.

RESULTS: 40 patients were enrolled. TNFα peaked at D3 (4.9 pg/ml). Administered insulin (InsAd) also peaked at D3 (32 U). Adipo peaked at D7 (10774 pg/ml) Endogenous insulin peaked with Adipo at D7 (2.8 ug/l). TG levels increased in parallel with TNFα from D0 to D3 and then declined. TC was lowest at D0 and increased upto D/C.

List of Spearman correlations:

- BMI and insulin administered an admission (r = 0.31, p = 0.053)
- Age and InsAd on discharge (r = 0.35, p = 0.032)
- Cortisol and TDI (r = 0.36, p = 0.001)
- IL-6 and glucose on discharge (r = 0.34, p = 0.042)
- IL-6 and Discharge CRP (r = 0.645, p = 0.0000)
- TNFα and adiponectin (r = -0.59, p = 0.000)
- Adiponectin and InsAd (r = -0.46, p = 0.005)

Finally survivors had a lower TNFα, IL-6 and higher cholesterol than non-survivors (Mann Whitney U test, p = 0.03, p = 0.008 and p = 0.009).

CONCLUSIONS: The peak inflammatory response and peak insulin requirement were noted between 48 and 72 hours. The major contributors to insulin resistance were BMI, age, inflammation, cortisol and an abnormal lipid profile. The major contributor to insulin sensitivity was adiponectin which downregulated TNFα and was associated with an improved lipid profile. Mortality was predicted by TNFα, IL-6 and total cholesterol.

THE ROLE AND EFFECTIVENSS OF A NURSE-PRACTITIONER INTENSIVE CARE OUTREACH SERVICE

Alison M Pirret

OBJECTIVE: This paper explores the role and effectiveness of a nurse practitioner intensive care (ICU) outreach service.

METHOD: Following introduction of a nurse practitioner ICU outreach service, concurrent data on patient demographics, number of patients and visits, type of interventions required, and outcome measures were collected between July 2006 and April 2007. Data analysis was completed using descriptive statistics, run and control charts.

OUTCOME MEASURES: Outcome measures included comparison of ICU readmissions, ICU readmission length of stay, APACHE II scores of ICU readmissions, ICU patient days/acuity; ICU readmission mortality, and ward cardiac arrests following establishment of a nurse practitioner service with concurrent data collected one year prior to implementation of the service.

RESULTS: There were 125 patients referred to the nurse practitioner which resulted in a total of 509 patient visits. The most common interventions required during visits included: patient/family support/education (22%), blood tests (17%), review/addition of medications (17%), electrolyte replacement (14%), specimen culture (10%), interdisciplinary referral (8%), altering O2 requirements (8%), and radiology investigations (5%). Run and control charts demonstrate a statistically significant reduction in ICU readmissions, ICU readmission length of stay and APACHE II scores of readmissions. There was no significant change in ward cardiac arrests. Currently ICU readmission mortality numbers are too small for analysis.

CONCLUSION: Data analysis demonstrates a nurse-practitioner-led ICU-outreach service has a positive effect on patient outcomes.

BACTEROIDES FRAGILIS CHANGING PATTERN FOR ANTIMICROBIAL SUSCEPTIBILITY FROM PATIENTS ADMITTED FOR COMMUNITY-ACQUIRED INFECTIONS AT THE JOHANNESBURG HOSPITAL

GA Richards, Sudeshni Naidoo, AG Duse, O Perovic

BACKGROUND: Anaerobes are commonly isolated as mixed populations of Gram-positive and Gram-negative organisms from abscesses and infections in the mouth, abdomen, soft tissues, pelvis, lung, liver, brain, and pancreas. Antimicrobial susceptibility testing for anaerobes is not routinely performed because it is costly and requires specialised expertise. As such, treatment is empirical and includes aerobic and anaerobic cover. This study determined the susceptibility patterns of community- acquired anaerobic organisms, particularly *Bacteroides fragilis*, isolated from clinical specimens.

METHODS: Prospective, descriptive and analytical study of susceptibility data of anaerobic organisms isolated from clinical specimens at Johannesburg Hospital. Susceptibility testing to estimate MIC was determined on all isolates using the Etest strip method. Interpretation was performed with reference to CLSI guidelines.

RESULTS: 180 anaerobic organisms were isolated from usually sterile sites (blood, fluid, tissue, pus sample) from June 2005 until February 2007. *Bacteroides fragilis* was isolated from 97 (54%) patients. The susceptibility profile of *Bacteroides fragilis* is presented in the Table below.

Table. Antimicrobial susceptibility of *Bacteroides fragilis*

Antibiotic (breakpoint of susceptibility µg/ml)	MIC µg/ml 50%	90%	Range	Susceptibility (%)
Penicillin (0.5)	24	96	0.064-256	3
Cefoxitin (16)	6	32	0.125-256	75
Ceftriaxone (16)	8	96	0.008-256	55.6
Amoxicillin/calavulanate (4)	0.25	1	0.023-3	100
Piperacillin/tazobactam (32)	0.25	4	0.016-32	100
Ertapenem (4)	0.25	2	0.002-32	95
Clindamycin (2)	0.5	256	0.016-256	75
Chloramphenicol (8)	1	2	0.094-3	100
Metronidazole (8)	0.5	64	0.023-256	86.6

CONCLUSIONS: This study demonstrated an increase in B. fragilis resistance to metronidazole, cefoxitin and clindamycin. Amoxicillin/clavulanate, piperacillin/tazobactam and ertapenem retained excellent susceptibility profiles to these isolates. These results indicate a need for changes with regard to empirical therapy of anaerobic infections.

A SINGLE EPISODE OF PRE-HOSPITAL HYPOTENSION PREDICTS THE NEED FOR EARLY OPERATIVE INTERVENTION FOLLOWING MAJOR TRAUMA

Simon Robertson, Euan Dickson

AIMS: The most common cause of hypotension following injury is ongoing haemorrhage which usually requires early surgical intervention. Class III haemorrhage is required to produce a decrease in blood pressure, and systolic hypotension is evidence that significant bleeding has already taken place. Our aim was to evaluate the ability of prehospital blood pressure to rapidly identify the high-risk patient who is likely to require operative intervention.

METHODS: Data were collected prospectively on 1 090 patients admitted directly to a Level 1 South African Trauma Unit over a 1-year period. Patients were subdivided into two groups according to their prehospital (PH) blood pressure. Hypotension was defined as a systolic blood pressure of less than 90 mmHg. Early surgical intervention was defined as the need for transfer from the resuscitation bay directly to the operating theatre.

RESULTS: PH hypotension correlated strongly with the need for early operative intervention ($p < 0.0001$, chi-square). The odds ratio for risk of surgery in the hypotensive patient was 1.53.

	PH blood pressure < 90 mmHg	PH blood pressure >/- 90 mmHg
No surgery	59.3% (*N* = 105)	73.5% (*N* = 671)
Surgery	40.7% (*N* = 72)	26.5% (*N* = 242)

CONCLUSIONS: Pre-hospital hypotension is strongly associated with the requirement for early surgical intervention, and should be used to alert the receiving team prior to the patient's arrival in the emergency department.

HYPERGLYCAEMIA AND OUTCOME AFTER SEVERE TBI

EL Gurnell, HP Shapiro

Hyperglycaemia is a result of a complex hormonal imbalance caused by a surge in circulating stress hormones after a traumatic brain injury (TBI). Neuronal damage caused by elevated serum glucose levels is thought to be related to continuing anaerobic metabolism and an increased concentration of lactate and hydrogen ions. (1)

A clinical audit of 80 patients admitted to a single neurosurgery intensive care unit at Pretoria Academic Hospital, over an 18-month period, was performed. Included in this study were patients with a GCS < 10 on admission who required mechanical ventilation and had no or relatively minor, non-life threatening injuries. 71 patients required ICP monitoring. Surgical evacuation of intracranial hematomas was performed where appropriate. Statistical analysis of GCS, glucose level and Glasgow outcome score was performed. A standard insulin sliding scale was used in all cases.

A literature review of hyperglycaemia and neurological outcome in TBI indicates that an elevated glucose level is associated with poor outcome and higher mortality. More recent ICU studies have also shown hyperglycaemia to be a poor prognostic factor and control of glucose to have a more favorable outcome.

Our data in accordance with published literature indicates that an elevated serum glucose level, greater than 15 mmol/L in our study, on admission is predictive of a most unfavourable outcome. This, despite strict control of glucose in ICU.

(1) Marsh *et al.* Effect of hyperglycemia on brain pH levels in areas of focal incomplete cerebral ischemia in monkeys. *J Neurosurgery* 1986; 65: 693-696

NURSES' ACCURACY IN ESTIMATING BACKREST ELEVATION

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INTRODUCTION: Elevating the backrest of ventilated patients has been associated with a decreased incidence of ventilator associated pneumonia (VAP). The CDC has recommended a backrest elevation of between 30° and 45° for ventilated patients.

OBJECTIVES: The aim of this study was to describe nurses' accuracy in assessing backrest elevation and their knowledge of why this is recommended.

METHODS: A prospective, cross-sectional and descriptive study was undertaken. Approval was obtained from the ethics committee and other relevant authorities. A convenience sample of nurses working in the selected ICUs on the study days was used.

RESULTS: Thirty-nine nurses participated in this study. The angle of the backrest was accurately assessed by 16 (44%) participants. All the others overestimated the angle Only 11 (28%) participants correctly stated that backrest elevation decreased the risk of aspiration, with only one (3%) participant adding that this may decrease the risk of VAP.

CONCLUSION: The results indicate that the nurses in this study may need assistance to accurately estimate backrest elevation angles. Furthermore nurses need to be aware of recommendations regarding patient care.

THE RISK ASSESSMENT FOR DELIRIUM AFTER CARDIOVASCULAR SURGERY

Noriyo Yagyu, Keiko Akashi

BACKGROUND: Patients undergoing cardiovascular surgery may be at particular risk of developing delirium, and may have modifiable factors that can be estimated by preoperative interventions. The aim of our study is to clarify the factor of delirium in the patients after cardiovascular surgery, and to obtain a new evidence of a nursing care, which can reduce the incidence of delirium.

METHOD: From May 2006 through September 2006, 54 patients at hospital admission for cardiovascular surgery were evaluated, obtaining ethical committee agreement from the hospital and written informed consent from the patients. The diagnosis of delirium was made by daily assessments of delirium using the NEECHAM Confusion Scale and depressive symptoms from patient interviews.

RESULTS: Of the 54 patients, 22 (40.7%) patients developed delirium within the 4 days after surgery (delirium-group). The delirium group showed statistically significant differences with regard to the age of onset and the risk score of post-operative stroke, compared with the patients without delirium (non-delirium-group). In the delirium group, pre-operative

cardiac function and SpO_2 levels before and after surgery were remarkably lower, and pre-operative blood pressure was significantly higher. Furthermore, there were significant differences in the length of ICU admission and the existence of emotional support between the delirium-group and non-delirium-group.

CONCLUSION: These findings suggest that the pre-operative assessment for delirium could be useful to identify patients at high risk for developing postoperative delirium. Future studies are needed to evaluate whether perioperative nursing intervention for these symptoms could reduce the risk of delirium.

AN INVESTIGATION INTO NURSES' PERCEPTION OF NOISE LEVELS IN THE CORONARY CARE AND NEUROSURGICAL INTENSIVE CARE UNITS AT GROOTE SCHUUR HOSPITAL

Nicki Fouché, Mary Mlewa

AIM: To investigate nurses' perception of noise levels in two intensive care units (ICU's) at Groote Schuur Hospital.

OBJECTIVE: To examine the effects of noise on caregivers.

POPULATION OF THE STUDY. The nursing staff (all categories) working in the above units.

SAMPLING METHOD: Convenience sampling was utilised and was determined by the willingness of the target group who participated in the study.

METHODOLOGY: A qualitative descriptive approach was selected to investigate the nurses' perceptions of the noise levels in the two units.

METHOD OF DATA COLLECTION: A structured questionnaire was utilised which consisted of open and closed questions. These were distributed to the research participants.

ANALYSIS: Information collected was analysed using a content analysis approach.

RESULTS AND DISCUSSION: The study findings revealed that the causes of noise in the two Intensive Care Units (CCU & NSU) was generated by

- emergency procedures
- staff and visitors talking
- patients shouting
- ward rounds
- technical equipment.

The stressors of noise on the nursing staff were discussed and implications and recommendations for nursing practice, education and further research were considered.

THE COST OF INTENSIVE CARE AT A SOUTH AFRICAN TERTIARY STATE HOSPITAL

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INTRODUCTION: Intensive care is generally regarded as very expensive therapy because of the high staff to patient ratio, sophisticated equipment and the extensive use of medication, blood products and disposable devices. Costs can be calculated either by using an average costing or 'top down' approach or by activity-based costing or 'bottom up' approach.[1] In 1992 the patient daily cost in a Pretoria academic ICU was estimated as R1 298.[2] An activity based study in the Respiratory ICU at GSH in 1994 reported the daily patient cost as R1 697.3 Recent European costs varied from €873 to €1318 (R8 293-R12 521).[4]

AIM: To establish the actual cost of patient care in the surgical intensive care unit of an academic tertiary hospital.

METHOD: An average costing method was used. Patient data were extracted from the ICU database. Expenditure for the 2005-6 financial year was obtained from the hospital pharmacy, stores, laboratories, blood bank, engineering and financial departments. Staff costs were calculated by taking actual salary levels of all staff and adjusting for activity outside the Unit and benefits. Overtime and agency costs were added. Capital equipment was calculated using a 5-year depreciation for electronic equipment and a 10-year depreciation for furniture and other equipment. Not included were certain overhead costs that could not be determined including administration and support services, linen, water, dialysis, repairs and radiology.

RESULTS: During the 2005-6 financial year there were 492 admissions, mean length of stay was 5.1 days and hospital survival rate 82%. Average expenditure was calculated as:

Category	Annual expenditure	Cost per patient per day
Staff	R6 620 711	R2 630
Consumables incl. pharmacy	R2 845 740	R1 131
Services	R56 541	R22
Equipment	R460 600	R182
Investigations (NHLS)	R1 399 710	R556
TOTAL	**R11 383 402**	**R4 521**

CONCLUSION. The average cost of an admission to the SICU is R23 137 and R28 317 is the cost of producing one survivor. Fixed costs, including staff and equipment depreciation, are 62% of total costs.

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Posters

FLUID RESUSCITATION GUIDED BY MIXED VENOUS SATURATION: APPLICABLE IN HYPOVOLEMIC SHOCK?

D Allard

We report on an aggressive fluid resuscitation in a postoperative trauma patient with profound metabolic acidosis (pH 6.82). The patient had survived a repair of a through and through laceration of the inferior vena cava at the level of the renal veins. The amount of fluids given was guided mainly by a mixed venous blood (SvO_2) gas estimate obtained via a central catheter in the superior vena cava (SVC).

We monitored the pH, the base excess, the lactate level and the O_2 saturation in the SVC blood, and gave the large amount of blood products and crystalloids in order to correct the SvO_2. The patient recovered from the transient disseminated coagulopathy and was extubated 25 hours post ICU admission. He was discharged from ICU after 3 days and went home on day 6, fully functional.

Is the SvO_2 a better resuscitation guide and is it applicable in hypovolaemic shock? We reviewed the literature and give the current guidelines.

RELATION BETWEEN SELF-CARE BEHAVIOUR AND SELF-CARE NEEDS IN PATIENTS WITH HEART FAILURE, 2006

Mohammad Aliha, Jaleh; Azarbad, Mohsen; Shahpourian, Farangis; Rafiee, Forough

BACKGROUND: The cost of repeated hospitalisation of patients suffering from congestive heart failure (CHF) makes the health care providers think of some proper ways to promote self-care behaviour of patients by improving their knowledge and abilities to do so. Therefore, assessing their self-care behaviours, needs and abilities is of a great importance.

OBJECTIVE: To determine self-care behaviours and their relation to the needs and abilities of patients with CHF.

METHOD & MATERIALS: This was a descriptive-correlational study based on Orem's self-care theory. Through convenience sampling 125 patients were selected. Data were gathered by using 4 different questionnaires.

RESULTS: Results showed that more than half of the patients (52%) had good self-care behaviours and about 85% had moderate, good or very good level of knowledge but also more than 80% stated their learning needs as high or very high. There was a positive significant relationship between self-care performance and learning needs (r = 0/57, p = 0/000). Self-care performance had a negative and significant relation with self-care knowledge limitations (r = -0/667, p = 0/000), A positive significant relationship was seen between self-care performance and knowledge (r = 0/665, p = 0/000). Basic conditioning factors of age, education, economic and living areas situation, health status, ejection fraction ratio, health problems, family support and accessibility to medical centers were related to knowledge and also to self-care performance.

CONCLUSION: Regarding the results we can conclude that nurses' knowledge about patients' self-care behaviours, their learning needs, their limitations of knowledge and also their knowledge about self-care and basic conditioning factors will help them to perform their supportive-educative intervention role based on Orem's self-care deficit theory.

A PROSPECTIVE AUDIT OF SPLIT SKIN GRAFTING FOR THE MANAGEMENT OF BURNS AT A REGIONAL BURNS UNIT

Nikki Allorto, Damian Clarke

Edendale Hospital Pietermaritzburg

INTRODUCTION: Burns are common at Edendale Hospital. Thirty per cent of these admissions require skin grafting. This audit reviews our experience with split skin grafting of burn wounds over a 6-month period.

METHODS: A prospective database was maintained from July to December 2006 for all burn wounds managed by split skin grafting. All grafts were done by a dedicated team and followed up by that team. Standard demographic data was recorded along with mechanism of burn, percentage, distribution, days from burn to graft and from graft to discharge, with a final wound assessment on discharge.

RESULTS: A total of 37 grafts were performed over 12 weeks. There were 13 children, average age of 3 (range 1 to 9 years). There were 24 adults, average age of 38 years (range 16 to 65 years). Half of the adults were epileptic. The male/ female ratio was 50/50. Sixty per cent of patients were burnt with fire and 40% with hot water. The average area grafted was 7% (range 1 to 18 %) Limbs were most commonly involved – 28% legs, 26% arms and shoulders, 7% hands, 5% feet, 19% torso and 11% buttocks. There was an average of 57 days from the time of burn to the day of skin graft, with the longest being 138 days and the shortest 12.

Patients were discharged on day 19 on average (range 9 - 60 days) There was complete graft take in 51%, partial graft take in 33% and graft loss in 16%.

CONCLUSIONS: Limited resources and lack of a dedicated team resulted in lengthy delays in the past. The establishment of a dedicated team has addressed some of these delays and produced acceptable results. Burns affect the vulnerable sectors of society.

PATIENT TRANSITION BETWEEN INTENSIVE CARE UNITS AND GENERAL WARDS

Bhengu BR

INTRODUCTION: General systems theories advocate for interface between components of the system including those of the health care system such as the ICUs, intermediate units and general wards and other institutions/units involved in the referral system. This can be achieved through smooth exchange of information, services and patients in order to meet the primary health care principle of continuity.

METHODOLOGY: The study was conducted in 5 hospitals where 8 nurses and 5 intensivists in charge of ICUs were interviewed. Inclusion criteria were being in charge and having decision-making power in ICU management and availability.

RESULTS: Nurses only communicated with each other across units to organise a bed and transport for the patient. They asserted that they were too busy and short staffed.

ICU directors kept patients longer in the ICUs for the following reasons:

- Lack of intermediate units (step down and high dependency units).
- A problem of perception whereby long-term ICU patients were perceived as usual general ward patients
- Sub-optimal staff and equipment in the general wards
- Anecdotal and empirical evidence of re-admissions linked with early ICU discharge
- Anecdotal and empirical evidence of being called to certify death rather than resuscitate

CONCLUSIONS: It appears that care of post-ICU patients is suboptimal outside of the ICU. This is ascribed to disparities in the provision of health care resources. Keeping patients longer in ICU has financial and ethical implications. Literature recommends follow-up nursing, improving standard of care in general wards rather than further specialisation in SDU and HDU through ICU outreach.

IN-HOSPITAL PSYCHOSOCIAL INTERVENTIONS FOR FAMILIES OF THE CRITICALLY ILL TRAUMA PATIENT

P Brysiewicz, B Bhengu, J Chipps

BACKGROUND: Nationally and internationally, trauma is rated as the leading cause of death for people aged between 1 and 34 years of age (Barret 2001). While there is literature that examines interventions for the psychosocial consequences and interventions for patients, there is little (nationally or internationally) on the in-hospital interventions for families of these critically injured trauma patients. South Africa has a large problem of trauma and the psychological suffering for such families may be devastating.

AIM: To explore psychosocial interventions for families of critically injured trauma patients admitted to ICU in selected hospitals in Durban, KwaZulu-Natal (KZN); review what psychosocial interventions would improve their outcomes and develop and evaluate an appropriate in-hospital psychosocial intervention for the families.

RESEARCH METHODOLOGY: This research study is divided into four phases namely; PHASE 1: A systematic review of the effectiveness of in-hospital psychosocial intervention programmes for families of critically injured patients; PHASE 2: Exploration of the families psychosocial support needs from the perspectives of families and nurses; PHASE 3: Development of in-hospital psychosocial family intervention; and PHASE 4: the implementation of the developed in-hospital psychosocial intervention using a randomised controlled trial.

RESULTS: This presentation will provide an overview of this research study and report on the findings from PHASE 1 and preliminary data from PHASE 2.

CRITICAL CARE OUTREACH, PERCEPTIONS AND IMPACT OF UNPLANNED ICU ADMISSIONS – A CASE STUDY

Carr M.

BACKGROUND: Worldwide many patients experience delays in receiving appropriate and timely care in general wards, which then increases the pressure on expensive ICU beds. Research by McQuillan (1998) highlighted sub-optimal ward care prior to ICU admission, while Franklin & Matthew (1994) observed that patients not identified early enough did not benefit greatly from eventual ICU admission. Critical Care Outreach (CCOR) is the organisational approach, whereby appropriate and timely care is delivered to patients irrespective of their location within a hospital. The aims are: to avert ICU admission; ensure timely admissions to ICU; facilitate discharge back to wards; offer direct clinical support to ward nurses.

OBJECTIVES: Assess impact of unplanned ICU admissions on length of hospital stay and increased costs. Ascertain medical staff perceptions in regard to care of critically ill ward patients. Analyse if a need for service exists.

METHOD: Questionnaires: ward nurses, doctors and ICU nurses.

Four month prospective data collection from patient notes who experienced unplanned ICU admissions.

RESULTS: Questionnaires revealed concerns with care of critically ill in ward setting, the need for Early Warning Scoring System and additional direct clinical support for ward nurses. Unplanned ICU admission increased length of stay and costs considerably.

Patient observations scored indicated significant clinical deterioration before nurses became aware.38.4% of unplanned admissions to ICU died.

CONCLUSIONS: Research has indicated a need for CCOR or components thereof.

LYMPHANGIOMATOSIS PRESENTING IN A CHILD IN THE CARDIOTHORACIC INTENSIVE CARE UNIT

S Chetty, K Vanderdonk, F Paruk, S Bhagwanjee, K Naidoo

CASE REPORT: A 2-year-old male patient was admitted with a pericardial tamponade, for which a percutaneous drain was inserted. Following drain removal the tamponade recurred and a formal pericardial window was performed. The patient continued to drain turbid fluid into his drains. The fluid was high in protein, LDH and triglycerides, suggesting it was chyle. A diagnosis of spontaneous chylothorax was made. Despite surgical and medical interventions, the patient demised. At post-mortem, a diagnosis of lymphangiomatosis was made.

DISCUSSION: *Thoracic lymphangiomatosis* can present in a number of ways including chylothorax, and, as a mediastinal mass, and therefore should be included as a differential diagnosis in a patient with either of these presentations. The prognosis in patients who present at age less than 16 years is poor. The same applies to patients who present with parenchymal lung involvement or a pleural efusion. *Diffuse pulmonary lymphangiomatosis* is uncommon and is characterised by an increasing number of anastomosing channels. Diagnosis is made from open lung biopsy, which shows endothelial lined spaces along pulmonary lymphatic routes. The disease is progressive and most aggressive in young children. *Generalised lymphangiomatosis* is a rare disease characterised by diffuse bony and soft tissue lymphangioma. Treatment is palliative and outcome is usually fatal.

CONCLUSION: Lymphangiomatosis is a rare disease that is usually fatal in children. The management of these patients involves multi-disciplinary involvement, which should be in the ICU environment, in order to improve the patient's chance of survival.

CRITICAL POINTS IN TREATMENT AND TRANSPORTING OF CRITICALLY INJURED PATIENTS

Rudi Kocevar RN, Irena Bucek Hajdarevic

Critical points in treatment of critically injured patients are mostly organisational in their nature and include material equipment, architectonic characteristics, the number of staff available and the number of injured patients.

The success of an intervention, and of further treatment of the injured patient, mostly relies on the first information. Incomplete data can cause an unsuitable evaluation of the nature and location of an event, its emergency level and arrangement of teams necessary for taking suitable steps.

For efficiency we would need a flawless communication between the prehospital unit and the hospital resuscitation team. If the communication fails, the latter loses time in preparing the equipment, apparatus and instruments, instead of immediately treating the patient.

Upon arrival at the hospital, the injured patient is taken over by the trauma team that continues with the care. The problem lies in the fact that, if the team is already engaged in another emergency operation, it is impossible for the trauma team to be complete.

Upon admittance the team must bear in mind the prescribed manner of replacing the apparatus and instruments, connecting the injured patient to the hospital transportation equipment, conduct measurements and only then remove the equipment from the field. If the patient is moved recklessly, we can only cause additional injuries.

Those patients have to be transported to distant places in order to have additional diagnostics performed. These transportations are urgent; that is why lack of time, many technical instruments and measures can lead to fatal mistakes.

CASE PRESENTATION – REVERSED ANION GAP METABOLIC ACIDOSIS

B Levy, P Williams, GA Richards

Two cases of reversed anion gap metabolic acidosis are presented and the potential causes discussed. The first patient overdosed on nitric acid and presented to ICU with a hyperchloraemic reversed anion gap metabolic acidosis. The second patient absorbed iodine from burn dressings and also developed a hyperchloraemic reverse anion gap acidosis. Both patients demised as a result of multi-organ failure secondary to the severe acidosis.

A brief description of each case with laboratory findings will be discussed along with potential causes of a reverse anion gap acidosis as well as the avenues available for the management thereof.

EXPERIENCES OF CRITICAL CARE NURSES IN THE MANAGEMENT OF A LARGE INTENSIVE/ CRITICAL CARE UNIT

M C Matlakala

University of Limpopo (Medunsa campus)

INTRODUCTION: As health care changes, demands for intensive care nursing changes continue to grow, thus calling for even larger intensive care units. The tendencies for hospitals in South Africa is to create larger intensive care units (ICUs), mostly understaffed, and which have to deal with a rapid turnover of patients. Critical care nurses are the kingpins in ICUs and are responsible for effective and efficient management of the units.

OBJECTIVE: The objective is to describe the experiences of critical care nurses in the management of a large intensive care unit.

METHOD: A qualitative, exploratory and descriptive design.

SETTING: A multi-disciplinary intensive care unit of a teaching hospital.

RESULTS: It is evident that there are several problems experienced by nursing staff in the management of the intensive care unit such as overcrowding and business of the unit, staffing and equipment and supplies shortages.

CONCLUSIONS: The experiences described call for multiple strategies in helping all the critical care nurses to manage this large unit effectively.

A CASE STUDY OF THE EFFECTS OF THERMAL THERAPY ON THE TIDAL VOLUME AND SEDATION LEVEL IN MECHANICALLY VENTILATED PATIENT

Kei Mizuno, Keiko Akashi

BACKGROUND: The thermal therapy (far infrared ray), physiotherapy technique is well known in Japanese nursing field. However the ventilator care executed by thermal therapy for ventilator discontinuation of critical ill patients is not conducted so far.

OBJECTIVE: Our main object is to clarify as to influence of tidal volume and sedation level by thermal therapy. We report these cases of patients with heart disease whose clinical course was discontinuation failure of mechanical ventilation.

METHOD: We have picked up two patients (case1 and case2) with approval from local ethics committee and informed consent from their blood relations. There were done in the intensive care unit of an emergency hospital in middle of Japan.

We have treated far infrared ray around chests for 15 minutes (40-42) after they rest in bed. Ventilator settings were case1 of volume controlled ventilation and pressure support mode, and then, case 2 of pressure mode ventilation.

We have collected the data of respiratory measurement and sedation score before thermal therapy and after it. Other measurements ware done homodynamics, skin and core temperatures.

SPECIFIC ISSUES (ICU) INITIATIVES THAT MAKE OPERATIONS WORK IN AN ICU

ON Moloi

Manager ICU, Dept. of Surgery Walter Sisulu University

INTRODUCTION: Intensive care covers a large range of activities and defies any attempt to define it with precision. It is also difficult to define attitudes towards intensive care therapy with any degree of precision.

Whereas about 50 years ago there was less tendency to try heroic efforts in the face of fatal illness or trauma, several factors have co-operated to bring about a change in attitude, which now favours active intervention under most circumstances.

At the same time, as the profession has become more aggressive in therapy, the public opinion, has in fact, been supporting such aggressiveness. As Lewis Thomas (S8) (1977) says, *'In a society adoring technology and wishing good health to be a human right, dying is regarded as the ultimate failure. The aim of the ICU is to prevent death when death is not inevitable and to restore the patient to his former state of health.'* Needless to say, nothing could better reflect the aim of public opinion.

The modern history of intensive care spans more than 5 decades. Its roots go far back, but thoracic surgeons and polio physicians must receive the credit for setting the stage for the modern era. We may wonder why it should have taken so long for the modern era to begin when most of the prerequisites were present at the turn of the last century. Perhaps half a century was required to bring all individual components together.

The importance of meticulous nursing care for the patient was obvious to the early ICU directors and it is still the cornerstone of ICUs today. Fifty years ago, units were started by enthusiastic and persuasive individuals, but today, unit planning is a demanding co-operative enterprise involving

doctors, nurses and administrators, as well as outside professional consultants.

My paper is intended to discuss determinants of ICU, administrative and operating procedures.

OBJECTIVES:

1. To highlight the importance of supportive services in an ICU, e.g. radiology and laboratory;

2. To emphasise the importance of education and training in ICU;

3. To emphasise challenges of communication in an ICU, and how to overcome them;

4. To highlight proper coverage by ICU-trained nurses in South Africa;

5. To show outcomes of positive attitude towards patient care and their families;

6. Sensitivity and awareness of the importance of the patient and his family;

7. To show the importance of the presence of a psychiatrist to attend to emotionally charged areas.

CONCLUSION: No system yet devised answers all questions in the allocation of human resources. Intensive care has probably achieved a reasonable measure of success with a lot of challenges previously unconsidered.

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EVIDENCE-BASED NURSING GUIDELINES FOR PRONE POSITIONING OF ADULT, VENTILATED PATIENTS

Suegnet Nortje, Elzabe Nel, Anna Nolte

Prone positioning of a critically ill patient poses a challenge to nursing interventions, but it remains the responsibility of nurses to develop a way to provide the same basic and intensive care to patients lying prone as opposed to patients lying supine. The purpose of this study was to do a systematic review in order to explore the evidence in support of the beneficial nursing interventions during prone positioning of ventilated patients and to develop evidence-based nursing guidelines with regard to the nursing process. This exploratory, descriptive and retrospective systematic review includes data from 45 clinical trials, with a total population of 2 148 patients. Data were extracted onto data abstraction forms, assessed for methodological quality and summarised into evidence tables. All statistical calculations for the meta-analysis were performed by the RevMan 4.2.8 program. Prone positioning showed significant ($p < 0.0001$) increases in the PaO_2 (WMD = 11.43) and the PaO_2/FiO_2 ratio (WMD = 21.58, 95% CI = 11.36; 31.8). The effects of complications, oxygenation and haemodynamic outcomes compared against the different prone positioning protocols had inconclusive results. Nursing guidelines to prone positioning were developed based on the best available evidence. The lack of nursing-care related articles on prone positioning was a major drawback. Based on these results, recommendations are made towards further study on the nursing care of prone-positioned patients.

HELLP SYNDROME: A PROSPECTIVE REVIEW OF 52 CONSECUTIVE ADMISSIONS TO AN INTENSIVE CARE UNIT

Fathima Paruk*, Satish Bhagwanjee*, David JJ Muckart#, Piet J Becker, Jack Moodley**

OBJECTIVES: (i) Describe ICU admissions with HELLP Syndrome. (ii) Ascertain differences between HELLP syndrome and other hypertensive disorders of pregnancy (HDP). (iii) Ascertain differences between survivors and non-survivors. (iv) Assess severity of illness by APACHE II score, Organ failure Score and SOFA Score.

DESIGN: A 2-year prospective study in the Surgical ICU at King Edward VIII Hospital, Durban. Ethics approval was obtained.

RESULTS: HDP comprised 66% of the total obstetric admissions (144, $N = 218$). Fifty-two admissions (36%, $N = 144$), exhibited all features of the HELLP Syndrome. They had a mean age of 27 years and gestation of 31 weeks. The mean platelet, bilirubin and LDH were 72000, 46 and 3130 µmol/ respectively. The mortality rate was 32.7% and 16.3% for HELLP syndrome and other HDP respectively. There were significant differences between these 2 groups in respect of parity, gestation, platelet count, bilirubin, GCS and organ failure scores ($p < 0.05$). Survivors and non-survivors of the HELLP syndrome exhibited significant differences in respect of GCS, APACHE II Score and SOFA Score (day 1 to 5) ($p < 0.05$). No patient with 3 organ failures exceeding 72 hours survived.

COMMENT: HELLP syndrome is associated with substantial morbidity and mortality.

KNOWLEDGE OF ICU NURSES REGARDING PAIN MANAGEMENT

Perrie H, Schmollgruber S

BACKGROUND: Pain has been cited as one of the greatest stressors to ICU patients, and has been associated with poorer patient outcome, unnecessary suffering and added health care expenditure. Nurses require an adequate knowledge in order to ensure optimal pain management of the patients in their care.

OBJECTIVES: The aim of the first part of this study, for MSc dissertation, was to describe the knowledge of ICU nurses regarding pain management, to compare the difference in knowledge between ICU-trained and non-ICU- trained nurses and to describe the impact of years of ICU experience on this knowledge.

METHODS: A prospective, descriptive, no- interventional study method was used. Approval was obtained from the ethics committee and other relevant authorities. The questionnaire used was developed and validated by two groups of ICU nursing experts. The study population included all consenting ICU nurses working in the selected units.

RESULTS: There were 136 participants in the study, (68 ICU-trained and 68 non-ICU trained). The mean score obtained was 43.97% (SD 15.45), ICU-trained participants obtaining 45.07% (SD 16.01) and non-ICU-trained obtaining 42.86% (SD 14.91). The correlation between knowledge and years of ICU experience was poor ($r = 0.031$).

CONCLUSIONS: This study found a lack of knowledge regarding pain management, no significant difference between ICU-trained and non-ICU-trained nurses and a poor correlation between knowledge levels and years of ICU experience.

KNOWLEDGE OF ICU NURSES REGARDING GLYCAEMIC CONTROL

Perrie H, Schmollgruber S

BACKGROUND: Maintaining normoglycaemia has been shown to have beneficial effects on the outcome of critically ill patients. However, in order to safely implement glycaemic control and avoid unnecessary complications associated with this practice, the nurse needs to have an adequate knowledge.

OBJECTIVES: The aim of the second part of this study, for MSc dissertation, was to describe the knowledge of ICU nurses regarding glycaemic control, to compare the difference in knowledge between ICU-trained and non-ICU-trained nurses and to describe the impact of years of ICU experience on this knowledge.

METHODS: A prospective, descriptive, non-interventional study method was used. Approval was obtained from the ethics committee and other relevant authorities. The questionnaire used was developed and validated by two groups of ICU nursing experts. The study population included all consenting ICU nurses working in the selected units.

RESULTS: There were 136 participants in the study, (68 ICU-trained and 68 non-ICU-trained). The mean score obtained was 48.71% (SD 13.30), ICU-trained participants obtaining 51.26% (SD 11.74) and non-ICU-trained obtaining 46.16% (SD 14.34). The correlation between knowledge and years of ICU experience was poor (r = 0.168).

CONCLUSIONS: This study found a lack of knowledge regarding glycaemic control, no significant difference between ICU-trained and non-ICU-trained nurses and a poor correlation between knowledge levels and years of ICU experience.

KNOWLEDGE OF ICU NURSES REGARDING WEANING FROM MECHANICAL VENTILATION

Perrie H, Schmollgruber S

BACKGROUND: Protocol-directed weaning has been associated with reduced duration of mechanical ventilation, decreased risk of complications, decreased length of ICU stay and reduced cost of ICU. Nurses, however, require a sound knowledge of ventilation in order to safely implement a weaning protocol.

OBJECTIVES: The aim of the third part of this study, for MSc dissertation, was to describe the knowledge of ICU nurses regarding weaning from mechanical ventilation, to compare the difference in knowledge between ICU- trained and non-ICU-trained nurses and to describe the impact of years of ICU experience on this knowledge.

METHODS: A prospective, descriptive, non-interventional study method was used. Approval was obtained from the ethics committee and other relevant authorities. The questionnaire used was developed and validated by two groups of ICU nursing experts. The study population included all consenting ICU nurses working in the selected units.

RESULTS: There were 136 participants in the study, (68 ICU-trained and 68 non-ICU-trained). The mean score obtained was 50.00% (SD 17.16), ICU-trained participants obtaining 53.99% (SD 18.19) and non-ICU-trained obtaining 46.01% (SD 15.18). The correlation between knowledge and years of ICU experience was poor (r= 0.118).

CONCLUSIONS: This study found a lack of knowledge regarding weaning from mechanical ventilation, no significant difference between ICU-trained and non-ICU-trained nurses and a poor correlation between knowledge levels and years of ICU experience.

THE EXPERIENCES OF CRITICAL CARE STUDENTS IN PRESENTING CASE STUDIES

M Phillips, Y Botma
University of the Free State

INTRODUCTION: Students in the Advanced University Diploma in Critical Care (General) programme at the UFS annually present three case studies on critically ill patients, with different diagnoses they have nursed for at least 18 hours, according to a given instrument.

OBJECTIVE: The objectives of this study were to determine the positive and negative experiences of critical care students regarding case presentations during 2006 and to generate recommendations on how to improve this experience for future students.

METHOD: A descriptive, quantitative study was performed. Consensus regarding the most important experiences and recommendations were obtained by means of the nominal group technique.

OUTCOMES MEASURES: Participants reflected in silence on three questions posed to them. Individually they listed five ideas on separate 3 x 5 index cards. Ideas were recorded using round-robin recording. Each participant rated, from the group's list, five items most important to them. The numeric value of each item was calculated and the items with the highest score were listed according to significance.

RESULTS: The first positively rated experience was that they learned to prioritise the patients' health care needs. The participants rated the stress associated with the presentations as the most negative experience. An orientation video that illustrates what is expected of them will most probably reduce the stress levels of future students.

CONCLUSION: Through exposure to case presentations critical care students developed skills required in the critical care environment, like prioritisation, stress management and a structure to base their performance on.

COMPARISON OF SURGICAL HAND SCRUB WITH BETADINE AND DECOSEPT ON BACTERIAL COLONY COUNT

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INTRODUCTION: Use of new methods for prevention of communicable diseases and infection control, nowadays in most operating rooms involves the surgical team scrubbing with an efficient agent for a short time, while in more of our operating rooms, traditional use of routine hand scrub (Betadine more than 3 min) is common. The aim of this clinical trial was to compare efficacy of Betadine and an alcoholic agent (Decosept) on bacterial colony count (BCC) in Social Provides Hospital in Khoramabad (west of Iran) in May 2006.

METHODS: 20 cases were selected of operating room scrub nurses according to various criteria. First, all subjects washed their hands for 1 min with soap. The bacterial pre-value was obtained by rubbing fingertips in Triptych Soy Broth (TSB) for 1 min. Then, in first stage, each subject scrubbed their hands with Betadine (povidone iodine 7.5 %) for 3 min and dried with a sterile towel after rinse.

Bacterial postvalue (immediate effect) was obtained for one hand and the other hand was gloved for 2 hours. After the gloves were taken off, a second postvalue was obtained for sustained effect. After 1 week, for second stage, all subjects first washed their hands and the bacterial pre-value was obtained as for first stage. Then, each subject scrubbed with Decosept by using as many portions as necessary to keep hands wet for 3 min (10-12 ml). Bacterial post-values

(immediate effect) were obtained for one hand and the other hand was gloved for 2 h. After the gloves were taken off, a second postvalue was obtained for sustained effect. Data were analysed by SPSS version 12. For comparison of BCC in each stage the paired t-test was used.

RESULTS: Comparisons of BCC frequency were different for immediate effect of Betadine and Decosept (38 & 25), and 2 h after scrub (72 & 40). The mean BCC reductions immediately after Betadine and Decosept scrub were of significant difference (PV=0.011). Also, the mean of BCC Incensement (sustained effect) were different (p = 0.011) 2 h after scrub. The mean of BCC immediate and 2 h after scrub with Betadine (first stage), showed Incensement (1.7). This Incensement after scrub with Decosept (second stage) was less than Betadine (1.15). So, the difference between first and second stages was significant (p = 0.001)

CONCLUSION: In general, comparison of BCC reduction in both stages (after scrub with Betadine and Decosept), not only in immediate but also sustained effect, showed the alcohol agent (Decosept) was more efficient in BCC reduction. We suggest more use of alcohol agents for hand surgical scrub instead of others.

CURB-65, PNEUMONIA SEVERITY INDEX AND APACHE II 25 SCORES TO ASSESS MORTALITY RISK IN COMMUNITY-ACQUIRED PNEUMONIA

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INTRODUCTION: Patients with community-acquired pneumonia (CAP) comprised 35.6% of the PROWESS study and 33.1% of the placebo arm. We investigated the use of CURB-65, the Pneumonia Severity Index (PSI) and APACHE II prediction scores to identify the CAP population from the PROWESS placebo arm at the greatest mortality risk.

METHODS: Patients were classified as having CAP if the lung was the primary infection site and the patient originated from home. The abilities of CURB-65, PSI and APACHE II scores to determine 28-day and in-hospital mortality were compared using receiver operator characteristic (ROC) curves and the associated areas under the curve.

RESULTS: PROWESS enrolled 278 CAP patients in the placebo arm. The areas under the ROC curves for PSI = 5, CURB-65 ≥ 3, and APACHE II ≥ 25 for predicting 28-day (c = 0.65, 0.66, 0.64, respectively) and in-hospital mortality (c = 0.65, 0.65, 0.64, respectively) were not statistically different from each other. The 28-day mortality of patients with a PSI score = 5, CURB-65 ≥ 3 and APACHE II ≥ 25 was 41.6%, 37.9%, and 43.5% respectively.

CONCLUSIONS: Despite early diagnosis and appropriate antibiotic therapy, conventionally treated CAP with PSI scores = 5, CURB-65 scores ≥ 3, or APACHE II ≥ 25 has an unacceptably high mortality. In this study, PSI, CURB-65 and APACHE II ≥ 25 scoring systems perform similarly in predicting 28-day and in-hospital mortality; however, the PSI and APACHE II are cumbersome and time-consuming to perform while CURB-65 is simple and rapid.

IMPAIRMENT OF RANGE OF MOVEMENT, MUSCLE STRENGTH AND ENDURANCE IN CHILDREN WITH BURNS OVER 10%, ON DISCHARGE FROM JOHNSON & JOHNSON PAEDIATRIC BURNS UNIT, CHRIS HANI BARAGWANATH HOSPITAL

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The Paediatrics Burns Units can accommodate 27 children, aged from newborns to 12 years old. Out of a total of 316 children admitted to the unit in 2006, 244 sustained hotwater burns and 37 flame burns. Over a 5-month period a total of 128 children have been admitted to the unit in 2007.

OBJECTIVE: This paper aims to assess the impairment of range of movement, muscle strength and endurance present in children with burns of more than 10% on the day of discharge.

METHOD: A pilot study involving male and female patients between 4 and 12 years of age admitted to the unit with burns of 10% or more. Children were assessed using standardised tests on the day of discharge.

RESULTS AND CONCLUSION: The results will be presented in terms of values gained for strength, range and endurance compared to normal values which exist for this population. Results and recommendations will contribute to the development of a more comprehensive rehabilitation programme for children suffering burn injuries.

COMMUNICATION WITH RELATIVES OF CRITICALLY ILL PATIENTS AND ETHICAL PRINCIPLES

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Communication knowledge places in the limelight comprehension between those who are communicating. For successful communication of nurses with patient or patient's relative much more is urgent and required. This communication has to be efficient, adjusted for easier understanding and highly respectful. All this is needed because a patient in the nursing process has a lot of difficulties: a severe illness, concerns about survival and long-term consequences and concerns about their family. That is why this communication has to be particularly sensitive, and above all, understandable also to persons with no or very little medical knowledge.

Patient's relatives have at all times a very important role and that is why we have to communicate with them attentively. We have to understand all the facts that influence our communication. Sometimes a patient's condition depends on this communication. That is why nurses must correctly perceivethe needs of patient's relatives.

A lot has been written about communication with relatives, but there are no one-sided, easy answers when it comes to concrete cases of communication. This has to be substantially sufficient and congruent with nurse competence. Patients' relatives often take offence at incomplete information from nurses. In our country we often hear a nurse saying, that she does not have the competence to give information. This should not be so. Nurses must give information that is in connection with nursing practice. To do so, a nurse should know her/his work as well as competences. It is not understandable why nurses are not presenting their work and profession as entirety at the time when they must prove their profession again and again.

Most common information that is expected from nurses is information about a nursing plan, ongoing nursing interventions and their outcomes, and about all needs of a patient. Nurses have to ascertain and meet those needs on daily basis. This brings about patient satisfaction and improvement of his/her condition.

Ethical principles in communication enable us as nurses to offer sympathetic and sensitive attitude to relatives. Nurses can offer plenty information if they are sufficiently educated about their profession. Nurses can provide information to relatives about all patients' needs, desires and their intentions. That is why nurses say that they are ambassadors of patients and their rights.

THE USE OF THE ALARIS® ASENA® CC SYRINGE PUMP WITH GUARDRAILS® SAFETY SOFTWARE TO REDUCE INTRAVENOUS MEDICATION ERRORS IN THE ICU

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OBJECTIVES: Medication errors and adverse drug events occur frequently in the ICU setting. The Alaris® Asena® CC Syringe Pump with Guardrails® Safety Software can help reduce intravenous medication errors by incorporating recommended standard dosing limits and safe infusion protocols. The use of Guardrails® Continuous Quality Improvement (CQI) Event Tracker records medication infusion alerts and captures any abnormal pump event or attempted infusion error. We performed an observational study to evaluate the Guardrails® Safety Software, to explore the clinical acceptance of the software, and to monitor and prevent any adverse intravenous medication events in the ICU.

SETTING: Wits Donald Gordon Medical Centre ICU, a 15 bedded multi-disciplinary teaching ICU.

METHODS: An observation study was conducted prior to installation of infusion pumps. Data were collected and drug dosage and infusion rates programmed into the infusion pumps. The subsequent study period lasted from November 2006 until April 2007. The number of infusion errors (exceeding the recommended safe drug dosages or infusion rates) were recorded and classified as severe, moderate or minor events.

RESULTS: The number of infusion errors reported during the sample period was 77, of which 19 were severe, 28 moderate and 30 minor events. All potentially harmful drug infusions were averted by the Guardrails ® Safety Software.

CONCLUSION: The use of Guardrails ® Safety Software, incorporating standard drug concentrations, weight-based dosing, and safe dosing and infusion limits, will assist ICU staff to administer the required medication at the correct dose and rate, and avoid potentially harmful drug overdose.

A PROFILE OF POSTGRADUATE ICU NURSING RESEARCH

Juan Scribante

INTRODUCTION: ICU nurses are accountable for setting standards of quality with regard to ICU nursing, and should contribute to ICU nursing practise by undertaking and implementing research. ICU nursing research also contributes to the progression of ICU knowledge, promotes better patient care and best practice, all of which address important challenges that ICU nursing is facing currently in South Africa.

The aim of the study is to compile a profile of postgraduate ICU nursing research that has been completed 2006 in the Nursing Departments of South African Universities.

The objectives were to:

- determine the number of projects completed at Masters and Doctorate levels respectively; and
- compare the 2006 profile with the 2000-2005 profile[1].

METHODOLOGY: A quantitative research design was used. WITS ethics approval was obtained. Programme leaders completed a consent form and an electronic questionnaire. The data were entered into a database and analysed using descriptive analysis techniques.

RESULTS: The number and focus of projects completed during 2006 are comparable with the 2000-2005 profiles[1]

Completed projects 2006	
Doctorate	0
Masters	17

CONCLUSION: There is a desperate need to increase the output of postgraduate ICU nursing research. This is an objective way for nurses to maintain and improve their position in the ICU team.

1. Scribante J, Bhagwanjee S: A profile of postgraduate critical care nursing research in South Africa *S Afr J Crit Care* 2006; 22:78-84.

STUDY OF THE EFFECT OF SELF-CARE BEHAVIOURS ON THE QUALITY OF LIFE IN PATIENTS WITH HEART FAILURE IN MEDICAL CENTRES AFFILIATED TO IRAN AND TEHRAN UNIVERSITIES OF MEDICAL SCIENCES AND HEALTH SERVICES,1385.

S Asemi, F Shojaei, A N Yarandi, F Hosseini

BACKGROUND: Heart failure, as a common disabling and fatal disorder, imposes a great burden on patients suffering from it. Finding ways to promote the quality of life of the patient will consequently diminish her/his problems and in this way nurses are those whom play the most important role.

OBJECTIVE: Study of the effect of self-care behaviours on the quality of life of patient with heart failure.

DESIGN: it was a correlational-descriptive study in which questionnairs were used to gather the data.

SAMPLE: The research sample included 250 patients with heart failure, selected by convenience random sampling method.

RESULTS: Based on the findings, there was a statistically meaningful relation between self care behaviours and the quality of life ($p = 0.00$). Also, all dimensions of the quality of life were related to self-care behaviours. This reveals that whenever self care behaviours are promoted, the quality of life would be more satisfactory. Besides 76.4% of the patients possessed moderate and low self-care behaviours level.

CONCLUSION: Overall,we found that the majority of the sample group possessed undesirable and low level quality of life and self-care behaviours. Patients with better quality of life reckoned that they had had more desirable self-care behaviour. So, it is recommended that in order to improve the quality of life of patients with heart failure, self care behaviours be enhanced by teaching and consulting programmes.

A RARE CASE OF VITAMIN D DEFICIENCY INDUCED MYOCARDITIS

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AIM: To report a rare case of acute myocarditis induced by severe vitamin D deficiency and related hypocalcemia.

METHOD: A 4-month-old infant was admitted directly from the ER to the PICU with shock and severe metabolic acidosis. The child was intubated and ventilated, given fluid resuscitation and inotropic support (dopamine and milnirone).

The CXR showed cardiomegaly and pulmonary congestion. The QTc interval was prolonged (0.58 secs). Fractional shortening (FS) was 3%. His total calcium was 1.3 mmol/l (iCa 0.73 mmol/l).

RESULTS: His hypocalcaemia was refractory to calcium infusion. The labs confirmed vitamin D deficiency rickets: ALP 505, PTH 58 pmol/l (1.3-6.8pmol/l). 25 OH vitamin D <7 nmol/l (53-150nmol/l), 1,25 OH vitamin D was 49 pmol/l (43-148 nmol/l). FISH deletion for Di George (22q 11.2 deletion) was negative. Infectious aetiologies were excluded: PCR for enterovirus (coxsackie) herpes, and mycoplasma were negative. Metabolic screen was normal including carnitine.

DISCUSSION: He was started on ergocalciferol 2000 IU day PO on Day 3 as well as calcitriol 0.25 microgram BID. His calcium normalised on day 5, inotropes were discontinued on day 5 and he was extubated on day 6. On day 8 a repeat echo showed a FS of 16-21% He was discharged on day 13. At his 2-month follow-up his biochemistry and vitamin D status, as well as his cardiac function were normal at which point his anti-failure medication (captopril and furosemide) was stopped. This case should alert physicians treating acute myocarditis to a potentially reversible cause of cardiac dysfunction.